

CLAIMS

WHAT IS CLAIMED IS:

- 1 1. An integrated circuit package comprising:
- 2 a printed circuit board having a ground ring connected to a ground plane of
- 3 the printed circuit board;
- 4 a non-metal connector attached to the printed circuit board within the ground
- 5 ring;
- 6 a metal casing substantially enclosing the printed circuit board but not
- 7 enclosing the non-metal connector, the metal casing having a metal lip
- 8 that makes physical and electrical contact with the ground ring of the
- 9 printed circuit board.
- 1 2. The integrated circuit package of claim 1 wherein the metal casing further
- 2 comprises:
- 3 a first metal portion that substantially covers a top surface of the printed
- 4 circuit board; and
- 5 a second metal portion that substantially covers a bottom surface of the
- 6 printed circuit board.
- 1 3. The integrated circuit package of claim 2, wherein the second metal portion
- 2 comprises a heat sink having a plurality of fins.

1 4. The integrated circuit package of claim 2, wherein the first metal portion makes
2 electrical contact with a first perimeter ground ring on the top surface of the printed
3 circuit board, the first perimeter ground ring substantially circling the top surface of the
4 printed circuit board, the first perimeter ground ring being electrically coupled to the
5 ground plane.

1 5. The integrated circuit package of claim 4, wherein the second metal portion
2 makes electrical contact with a second perimeter ground ring on the bottom surface of
3 the printed circuit board, the second perimeter ground ring substantially circling the
4 bottom surface of the printed circuit board, the second perimeter ground ring being
5 electrically coupled to the ground plane.

1 6. The integrated circuit package of claim 5, wherein the first perimeter ground
2 ring is coupled to the second perimeter ground ring by a plurality of vias spaced
3 intermittently around the first and second perimeter ground rings.

1 7. A transmitter comprising:
2 a printed circuit board having a top surface and a bottom surface, the top
3 surface having a first perimeter ground ring, and the bottom surface
4 having a second perimeter ground ring, the first perimeter ground ring
5 substantially circling the top surface of the printed circuit board, the
6 second perimeter ground ring substantially circling the bottom surface
7 of the printed circuit board;

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8 a first metal casing substantially covering the top surface of the printed
9 circuit board, the first metal casing being in electrical contact with the
10 first perimeter ground ring; and
11 a second metal casing substantially covering the bottom surface of the
12 printed circuit board, the second metal casing being in electrical
13 contact with the second perimeter ground ring.

1 8. The transmitter of claim 7 further comprising:
2 a plurality of vias electrically coupling the first perimeter ground ring with
3 the second perimeter ground ring.

1 9. The transmitter of claim 7 further comprising:
2 a ground ring on the top surface of the printed circuit board;
3 a non-metal connector coupled to the top surface of the printed circuit board,
4 within the ground ring, wherein the first metal casing surrounds a
5 perimeter of the non-metal connector and makes electrical contact with
6 the ground ring.

1 10. The transmitter of claim 7, wherein the second metal casing has fins and
2 serves as a heat sink.

1 11. The transmitter of claim 7, wherein the first metal casing at least partially
2 overlaps a perimeter of the second metal casing.



1 12. The transmitter of claim 7, wherein the second metal casing at least partially
2 overlaps a perimeter of the first metal casing.

1 13. A method of reducing EMI from a transceiver, the method comprising:
2 attaching a non-metal connector to a printed circuit board having a ground
3 ring;
4 surrounding the printed circuit board with a metal shield except for the non-
5 metal connector, the metal shield making physical and electrical
6 contact with the ground ring.

1 14. The method of claim 13 further comprising:
2 inserting an electrically conductive gasket between the metal shield and the
3 ground ring.

1 15. The method of claim 13, wherein surrounding the printed circuit board with a
2 metal shield further comprises:
3 covering a top surface of the printed circuit board with a first metal casing
4 having an opening for the non-metal connector; and
5 covering a bottom surface of the printed circuit board with a second metal
6 casing.

1 16. The method of claim 15, wherein covering the top surface of the printed
2 circuit board further comprises:

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3 making electrical contact between the first metal casing and a first perimeter
4 ground ring circling the top surface of the printed circuit board.

1 17. The method of claim 16 further comprising:
2 inserting an electrically conductive gasket between the first metal casing and
3 the first perimeter ground ring.

1 18. The method of claim 15, wherein covering the bottom surface of the printed
2 circuit board further comprises:
3 making electrical contact between the second metal casing and a second
4 perimeter ground ring circling the bottom surface of the printed circuit
5 board.

1 19. The method of claim 18 further comprising:
2 inserting an electrically conductive gasket between the second metal casing
3 and the second perimeter ground ring.

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